

**Water Resources Sustainability Project  
(WRS)**

**1999 Annual Report  
January 1 to December 31, 1999**

**Deliverable for  
United States Agency for International Development**

**Contract No. 608-0222-C-00-6007-00**

**January, 2000**

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## **Introduction**

This report presents the progress made by the WRS project in calendar year 1999 towards attaining the intermediate results of USAID's environmental strategic objective to "improve water resources management in the urban, agricultural, and industrial sectors". 1999 was the year for implementation of the WRS pilot projects. In both the Drarga and the Dokkarat pilot projects, we made considerable progress towards successfully completing the construction phase of the projects. We also completed nearly 80% of our proposed program for the Nakhla watershed and started replication activities for the soil erosion control project. In the policy area, we conducted a study to help the Ministry of Environment set tannery norms and standards, and we organized high visibility VIP visits to the project sites. The progress made in 1999 is keeping us on track to successfully complete the ambitious agenda of WRS to finish three pilot projects demonstrating innovative approaches to water resources management in the urban, agricultural, and industrial sectors and to lay the seeds for successful dissemination of these best practices.

Chapter 1 presents more details of the project's progress in 1999. Chapter 2 discusses the progress made towards reaching the project's indicators and intermediate results. We have included many pictures in the report to illustrate our activities. Budget expenditures and a list of reports are included in annexes.

## 1. Achievements

This section presents a summary of the achievements of the project in 1999.

### 1.1 Drarga Wastewater Treatment and Reuse Pilot Project

#### *Construction of the Wastewater Treatment Plant*

Construction activities of the wastewater treatment plant in Drarga continued unabated throughout 1999. Site clearing work began in January and excavations started in February. We moved massive quantities of soil to create the various basins that constitute the plant. Exhibit 1 presents a schematic diagram of the plant and shows when the different components were completed. By the end of 1999, all of the major civil engineering works were completed. This includes the construction of eight concrete basins (two anaerobic basins, two denitrification basins, two regulation basins, one sludge drying bed, and one intermediate pump station); the excavation and adjustment of ten sand filters, two reed beds, and one storage basin; the construction of the main canal for the transport of effluents to the sand filters; and the construction of the operator's house and laboratory.

#### *Purchase and Delivery of U.S. Equipment*

In 1999, we purchased all the equipment necessary for the wastewater treatment plant. The equipment purchased in the United States and shipped to Agadir included pumps, weirs, sluice gates, telescopic valves, sludge pumps, and a bobcat. The equipment is being stored at the Commune of Drarga pending installation.

#### *Installation of Synthetic Liner*

We installed a synthetic liner in the basins that receive treated effluents (sand filters, reed beds, and storage basin). The synthetic liner was imported from the United States and installed by the manufacturer (Grundell).

#### *Installation of Pipes*

Following the installation of the synthetic liner, PVC pipes were installed in the sand filters and reed beds. Pipes were also installed in the sludge drying beds.

#### *Laying of Sand and Gravel*

In November 1999, we started laying sand and gravel in the reed beds, sand filters, and sludge drying bed. By the end of 1999, we completed the installation of sand and gravel in the sludge drying beds; the laying of gravel in the reed beds; and the laying of sand and gravel in two sand filters.

### 1.2 Chromium Recycling Pilot Project in Dokkarat

In 1999, we began the construction of the chromium recycling plant in Dokkarat. The key achievements are described below.

### ***Separation of Tannery Effluents***

The separation of tannery effluents in the 16 tanneries of Dokkarat started in 1998 and was completed in 1999. All 16 tanneries have now constructed separate canals for transporting chromium effluents within their tannery, installed gates to channel effluents, and screens to filter coarse materials. In December 1999, we conducted a test of the separation system in each tannery.

### ***Construction of the Piping Network***

In 1999, we completed the construction of the piping network to transport chromium effluents from the tanneries to the chromium recovery plant. The network, which is over three kilometers long, links all the tanneries to the plant through PVC pipes. The construction work also included building manholes throughout the network, an effluent chamber at the entrance of the plant, and the rehabilitation of an alley where three tanneries were discharging wastes in a clogged and broken sewer line.

### ***Purchase and Delivery of US Equipment***

The chromium recovery plant requires specialized equipment (tanks, pumps, filter press). The equipment for the plant was purchased in the United States and shipped to Fes in April 1999. The plant equipment is being stored at the RADEEF pending completion of the facility's construction.

### ***Construction of Foundations***

One of the difficulties encountered in 1999 was the construction of the foundations for the chromium recovery facility. Given the weight of the equipment and the vibration of the pumps, it is essential that the site foundations be solid. The first company contracted (SONACOTRAP) to do the work in April started excavations and concluded they could not do the job. We had to resort to a contract with another company (El Mokha) that started work in May. The construction of the foundations proved difficult due to the height of the water table and the unstable soil. El Mokha completed the foundations in September.

### ***Construction of the Facility***

Progress on the construction of the facility has also been slow. After the foundations were completed, the construction company reconstituted the soil, compacted the soil below the platform and prepared the steel for the platform. By the end of December, they had started building the pillars around the site and completed the pillars of the office and storage areas. However, pouring of the concrete for the platform had not begun at the end of the year.

## **1.3 Soil Erosion Control Project in Nakhla**

In 1999, we made considerable progress in implementing both direct and indirect activities in the Nakhla watershed. Below, we describe the project's achievements in 1999.

## ■ **Direct Interventions**

### ***Olive Tree Planting***

Approximately 34,000 locations were identified on 240 ha of land in Zones 2 and 3 for olive tree plantings. An additional 9,000 locations were also surveyed and planted with olives on 50 ha in Zones 2 and 3 in response to a great demand for trees from the villagers. Thus, a total of 43,000 olive trees were planted in Zones 2 and 3 on 290 ha of land. Another 10,000 sites were surveyed on 55 ha in the area of Zone 2 adjacent to Zone 1 for next years' olive tree plantings.

During December of 1998 and January of 1999 approximately 43,000 olive trees were planted in Zones 2 and 3 on land belonging to 199 cooperators. Since the start of the project, 61,300 olive trees have been distributed to 443 cooperators..

An informal survey of tree mortality found that roughly 5-10% of the trees planted during the second year of the project had died. This is considered a normal rate of mortality. Mortality is a result of several factors, including improper loss of soil around roots during transport before planting, poor contact between roots and soil after planting, and drought. In contrast, the mortality rate during the first year of the project was 10-15%. This increased rate was a result of drought, lack of cuvettes to store water during summer, and uncontrolled grazing by goats.

Farmers are extremely pleased with the olive tree planting program. They understand that when these trees begin producing olives, the household income of project cooperators has the potential to increase significantly. Cooperators in each zone have requested that the project provide a few collective olive oil extraction units to process the olive crop.

### ***Development of Supplemental Irrigation Water Sources for Olive Tree Plantings***

Damages by drought during the summer have largely been ameliorated in Zone 1 after construction of 7 water reservoirs. Each reservoir has a water storage capacity of 10 cubic meters. The water is supplied by springs, which have been developed and improved by WRS contractors. Springs are lined by rocks and have a concrete receptacle on the ground from which water is piped by gravity to each reservoir..

### ***Construction of Cuvettes Around Planted Olive Trees***

After the Work Center held a workshop on construction of cuvettes, cooperators built cuvettes around roughly 70% of the olive trees in Zones 2 and 3, and around 50% of the trees in Zone 1. Visual inspection of these cuvettes showed that the perimeters were generally in good shape, although most of the basins have filled in with fine sediment eroded from upslope cultivated lands.

### ***Application of Fertilizer to Olive Tree Plantings***

Fertilizer for olive trees was applied to olive trees in Zones 2 and 3 during the second week of December. Twenty one tons of ammonium sulfate (21% nitrogen) were trucked to strategic points along the main highway by Work Center personnel and distributed to cooperators. Demonstrations for applying fertilizer in olive tree cuvettes were made in tree basins along the highway.

### ***Improved Access to Agricultural Management Tools***

Dryland agricultural lands in Oued Nakhla are managed using traditional methods, including wooden plows pulled by animal traction. Modern tools are generally not available for routine practices such as spraying of herbicides and insecticides, pruning trees, sawing or chopping wood, or plowing. In recognition of excellent cooperation with project activities (construction of cuvettes and irrigation of trees), 10 cooperators in Oued Nakhla were each provided a hand sprayer.

The Work Center has started to make available modern agricultural tools for loan to cooperators. WRS purchased 2 motorized sprayers, 50 hand sprayers, 50 pruning shears, 50 saws, and 5 axes for loan to cooperators through the Work Center. WRS is in the process of purchasing 50 iron plows, each weighing 14 kg. The Work Center has held an informal workshop with 12 farmers in zone 1 on the proper use of iron plows, and will hold workshops on the proper use of each tool in all zones during the upcoming year.

### ***Stabilization of Ravines***

A contractor was hired by WRS to stabilize 5 ravines with a total length of 1.5 km in Zone 1. Construction of a combination of check dams and gabions was completed in December of 1998 and January of 1999. Inspection of the check dams and gabions showed that they were well designed and constructed. Most check dams and gabions had trapped a significant amount of fine to coarse debris from water flowing through the ravines after heavy rainstorms. In several cases, the area immediately upslope of gabions is completely full of stones washed downstream by heavy flows of water. This visual evidence shows that ravines are an important source of sediment to the river.

Ravines in Zones 2 and 3 were surveyed to identify sites suitable for installation of gabions and check dams. It was found that ravines in Zones 2 and 3 were heavily vegetated, and did not require additional structural rehabilitation.

## **■ Indirect Actions**

### ***Improvement of Goat Breeding Stock***

The importation of improved goat breeding stock (Morceano) from Spain was seriously delayed by an epidemic. After Spain controlled the outbreak of disease in their goats an agreement was signed in September between Morocco and Spain to allow the resumption of goat imports. The epidemic seriously depleted the number of goats available for importation.

Although the project desired 50 male goats for improved breeding stock, only 25 were available. Additional efforts are needed to acquire 25 more goats from Spain. In November, 25 male goats were imported and sent to a goat farmer for quarantine.

### ***Development of Beekeeping Production System***

The Agence du Nord purchased 100 beehives for distribution in Zone 4, where the matorral is in very good condition for producing nectar needed by bees. They also purchased two sets of beekeeping equipment for use by a collective of 25 cooperators who manage the beekeeping operations. This equipment includes protective suits, knives, collectors, smokers, extractors, vats, and tubs. The Work Center and DPA identified 25 cooperators who were willing to work together in managing the beekeeping operations.

### ***Development of Irrigated Fruit Tree Production***

A meeting was held with 32 farmers in Zone 1 to determine their level of interest in obtaining fruit trees. Most of the farmers had limited interest, with a preference for only 600 apples, peaches, nectarines, and quince expressed at the meeting. The DPA believes there will be greater interest in fruit tree plantations on irrigated terraces in Zone 3 (near Achekrade), and has identified 12-20 ha of land for fruit tree plantings.

## 2. Progress Towards Objectives

This section shows how the activities undertaken by WRS in 1999 will help us reach the project's indicators of performance and intermediate results. WRS is responsible for reaching targets for six indicators of performance under former Strategic Objective 2 of USAID:

- Indicator 2.1: Amount of water pollution in target areas
- Indicator 2.2: Amount of water savings in target areas
- Indicator 2.3: Volume of soil erosion in target areas
- Indicator 2.1.1: Progress towards the adoption of key policy reforms
- Indicator 2.2.2: Percent of tanners adopting chrome recycling technologies
- Indicator 2.3.1: Number of environmental activities implemented with non-governmental partners

### 2.1 Indicator 2.1: Amount of Water Pollution in Target Areas

This indicator is reached through implementation of the chromium recycling facility in Fes and of the wastewater treatment plant in Drarga. In 1999, we made substantial progress in implementing both of these projects.

In Fes, we completed construction of the piping network to transport chromium effluents from 16 tanneries to the centralized chromium recovery plant. We arranged for the shipment of the industrial equipment required for the plant from the United States to Fes. Finally, we started construction of the chromium recovery facility. At the end of 1999, the foundations and the concrete platform have been completed. We expect the plant to be finished by the spring of 2000. By the end of 1999, construction of the chromium recovery plant in Dokkarat in 60% complete (from 0% at the beginning of 1999)

In Drarga, we have made substantial progress in the construction of the chromium recovery plant that started at the beginning of the year. At the end of 1999, we had completed all of the major civil engineering work including construction of: a screen and grit removal chamber, two anaerobic basins, two denitrification basins, two regulation basins, ten sand filters, one intermediate pump station, two reed beds, one sludge drying bed, one storage basin, the main canal for effluent distribution in the reed beds, and the operator house and laboratory. In addition, electricity was brought to the site and all of the required equipment for the plant was shipped from the United States to Drarga (pumps, telescopic valves, sluice gates, plates, and a bobcat). We also completed the installation of synthetic liners, shipped from the United States, on the reed beds, sand filters, and storage tank. We installed PVC pipes in the appropriate basins and started the installation of sand and gravel. By the end of 1999, construction of the Drarga wastewater treatment plant was 80% complete (from 0% at the beginning of 1999).

### 2.2 Indicator 2.2: Amount of Water Savings in Target Areas

Once the Drarga plant is operational, we fully expect that all the treated effluent produced will be reused in agriculture. As we described above, we made considerable progress in 1999 towards completing the construction of the Drarga plant. In the Year 2000, we will complete the network to distribute the treated effluents to farms for irrigation.

The soil erosion control project in Nakhla will eventually increase the holding capacity of the Nakhla dam, leading to water savings. In 1999, we have almost reached our soil erosion control targets with our activities in the watershed.

### **2.3 Indicator 2.3: Volume of Soil Erosion in Target Areas**

The pilot project has generally been on target with respect to indicators of progress identified in the 1999 Workplan (see Table 1).

Among the salient accomplishments of PREM and its project partners in 1999 are the following:

- Signed Project Workplan with Ministries of Environment and Agriculture, Agency for Development of the North, and the Tetouan Provincial Government.
- Added 224 village cooperators to project implementation activities, and initiated discussions with 98 women concerning cookstoves in Zone 1.
- Conducted workshops covering 7 topics relating to project implementation activities. These topics included construction of cuvettes, beekeeping, goat production, rangeland restoration, cookstoves, and replication of project activities.
- Established 8 demonstration trials in four project zones concerning wheat, forage, and grass strips. These demonstrations address issues such as seeding rate, variety performance, fertilizer management, and tillage management.
- Planted 43,000 olive trees on 290 ha of cultivated dryland in Zones 2 and 3.
- Constructed cuvettes around 70% of the trees in Zones 2 and 3, and 50% of the trees in Zone 1.
- Protected newly planted olive trees using 4 paid guards.
- Developed 7 reservoirs to irrigate olive trees in Zone 1 during the summer drought.
- Applied 0.5 kg ammonium sulfate fertilizer to 43,000 olive trees in Zones 2 and 3.
- Purchased modern agricultural management tools for spraying, pruning, sawing, cutting, and plowing olive trees. These tools will be loaned to project cooperators.
- Stabilized 1.5 km of ravines in Zone 1 using a combination of check dams and

gabions.

- Imported 25 Spanish goats for distribution to 25 cooperators in Zones 1-3.
- Provided 100 beehives and several complete sets of beekeeping equipment to 25 cooperators in Zone 4.
- Reseeded 12.5 ha of degraded matorral in Zone 2 with grass forage.
- Reduced erosion on dryland olive tree plantings by an estimated 11 tons/ha, or 2,365 tons for the entire planted area.

<b>Table 1</b> <b>Indicators of Project Success</b>		
<b>Indicator</b>	<b>Target</b>	<b>Actual Quantity</b>
✓ Sign Workplan Agreement with Project Partners	1	1
✓ Number of Contracts Signed with Farmer Cooperators	-	224
✓ Olive Tree Plantings	240 ha	290 ha
✓ Cuvette Construction	390 ha	440 ha
✓ Hire Guards for Trees	-	4
✓ Irrigation Reservoirs	3	7
✓ Grass Strips Between Trees	170 ha	2 ha
✓ Reduced Erosion	25-49%	15-20%
✓ Number of farmers and families trained in conservation techniques	-	138++
✓ Number of workshops and training sessions	6	7
✓ Stabilization of ravines		
✓ Planting of ravines	1.5 km	1.5 km
✓ Purchase Spanish Goats	1.5 km	0 km
✓ Improved Farm Equipment	20	25
✓ Beekeeping Operations	8	165
✓ Rehabilitate Matorral	100	100
✓ Survey Irrigation Canals	32 ha zone 2	12.5 ha -

## 2.4 Indicator 2.1.1: Progress Towards Policy Reforms

In 1999, we fielded a team of experts to assist the norms and standards committee of MOE to expand the background document used for setting environmental standards for the tannery industry. The document will help push the process towards the adoption of standards for the tannery industry by the Conseil National de l'Environnement (CNE) and will also

serve as a model for background documents in other industrial sectors.

We produced a dissemination strategy that will help focus our efforts to extend best practices to other areas of Morocco. We also began our dissemination efforts with a replication workshop held in the Nakhla watershed. The workshop was well attended and participants talked about ways in which soil erosion control activities in the Nakhla watershed could be replicated in other areas of Morocco.

In 1999, the visibility of MOE was enhanced by high visibility visits by the U.S. ambassador to project sites in Nakhla and Drarga. These visits were given intensive media coverage and the role of MOE in the projects was prominently featured.

We provided training on cost recovery to the Al Amal water users association, the Commune of Drarga, and other institutional partners for the Drarga wastewater treatment and reuse project. At the training, we presented a spreadsheet model to help the association recover the operating costs and some of the capital costs of the project. We prepared a report describing the model and how it can be changed over time to reflect realities in the field.

All of the activities we have undertaken in the policy area help us reach the indicator of progress towards key institutional reforms including: industrial norms and standards, progressive pricing policies, increased status of MOE, empowerment of water users association, and the application of the polluter-pays principle.

## **2.5 Indicator 2.2.2: Percent of Tanners Adopting Chromium Recycling Technologies**

In 1999, the tanners of Dokkarat installed gates and screens to complete the chromium separation system within their tanneries. In December, we held meetings with the tanners on the separation of their chromium effluents to ensure they would do it properly. At that meeting, the tanners reiterated their commitment to the project and their willingness to send their chromium wastes to the recovery plant. In the Year 2000, we will be working with the tanners of Dokkarat on the purchase and reuse of recovered chromium.

## **2.6 Public Participation for Environmental Action**

Public participation activities have continued to be an important part of the WRS project in 1999. In the Nakhla watershed particularly, public participation activities occurred throughout the year.

WRS held regular meetings during 1999 with Community Associations in each of the four project zones. In general, they meet twice with the Community Associations before implementation of any project activity, and once afterwards.

Farmer participants in WRS activities in 1999 grew to include an additional 1999 cooperators in Zones 2 and 3, and 25 cooperators in Zone 4. A total of 468 cooperators have now participated in project implementation activities throughout Zones 1-4. In addition, discussions concerning cookstoves were held with 98 women in Zone 1. Numerous

workshops and informal discussions took place during 1999 with villagers.

### ■ Workshops

- The Agricultural Work Center in Ben Karrich conducted a workshop on construction of cuvettes around olive trees. At this workshop there were demonstrations showing how wide and deep to make cuvettes, and how to line them with rocks to stabilize the lower edge. The benefits of cuvettes were explained to farmers. These benefits include capture of water to allow better growth of olive trees, collection of soil eroding from upslope cultivated areas, and a well-defined area in which fertilizer can be placed.
- In April, a two day formal workshop was held on beekeeping techniques for the 25 cooperators in Zone 4. The first day of the workshop focused on methods, while the second day was devoted to practical demonstrations in the field.
- In May, there was a formal two day workshop on goat production and management techniques. Attendees included 18 cooperators from 6 douars, two representatives of the Ministry of Environment, and a representative from the Agence du Nord.
- We held five 2-day workshops during August on rangeland restoration in each of 5 villages throughout Zones 2, 3, and 4 of Oued Nakhla. In these workshops villagers were informed about the relationship between a healthy mattoral and grazing quality. Topics discussed included grazing of indigenous plant species, importance of protecting and restoring the mattoral, time required for establishment of newly seeded forage grasses (2 cycles over a year and a half), and the carrying capacity of newly planted areas.
- From June 2-5, we held a workshop to review a survey she conducted of village women in zone 1 (Bettara and Ouadiyine) about preservation of forest resources in Oued Nakhla. The survey included women from 48 families in Bettara and 51 families in Ouadiyine.
- From June 14-16, we held a workshop on the replication of WRS activities in the Nakhla watershed. Attendees included representatives from the Work Center, the DPA, the DREF, the MOE, the MOA in Rabat, NGOs, and the Ministry of Interior. In total the workshop was attended by 50-60 people.
- The Work Center established several demonstration sites during the months of November and December in each of the four project zones. These demonstrations are of three major types, namely; wheat variety trials, forage variety trials, and grass strip demonstrations.

### ■ Other Activities

In 1999, WRS sponsored a workshop on water management in the Souss-Massa that

was attended by representatives of water users associations in the area. WRS also sponsored, in conjunction with the Peace Corps, a workshop on environmental education for teachers in areas near national parks. The workshop's aim was to raise awareness on critical environmental issues, including the degradation of water resources, that are affecting Morocco.

### 3. Field Missions in 1999

Below is a summary of missions fielded by WRS during 1999.

- A team composed of **Mr. M'Hammed Tayaa** (Chemonics), **Mr. Rachid Bouabid** (Chemonics), **Mr. Fouad Rachidi** (University of Georgia), and **Mr. Mohammed Mounsif** (University of Georgia) was fielded in the first quarter to assist in the implementation of project activities in the Oued Nakhla watershed. Specifically, Mr. Tayaa oversaw the work on stabilization of ravines, Mr. Rachidi and Mr. Bouabid worked on the tree planting campaign and in drafting the “contrat programme” with the DPA, Mr. Mounsif worked on the preparation for the campaign to improve goat herding by vaccinating local goats and importing Spanish male goats.
- **Mr. Mohamed Serehane** (Chemonics), was fielded in February and March to undertake a study of the possibilities for improving honey production in the area of Zerka (Zone IV) in the Nakhla watershed.
- **Mr. N'Gardomte Djimadoum** (ECODIT) was fielded in February and March to supervise the construction of the Drarga wastewater treatment plant and produce detailed reports on progress.
- **Mr. Nasser Chami** (ECODIT) was fielded in February and March to prepare terms of reference and monitor the construction of the chromium recovery plant in Fes.
- **Mr. Jean Tilly** (ECODIT) was fielded in March to assist in bid evaluations for the construction of the Dokkarat chromium recovery plant and to assess the progress of WRS pilot projects.
- **Mr. Edward Rawson** (Chemonics) was fielded to in April to assess the progress of WRS activities and compliance with contractual obligations of Majestic (construction contractor for the Drarga wastewater treatment plant).
- **Mr. Joseph Karam** (ECODIT) was fielded in April and in June to develop a cost-recovery model for the Commune of Drarga and the Al Amal water users association for the management of the wastewater treatment plant.
- A team composed of **Mr. Dave Swift** (University of Georgia), **Mr. Fouad Rachidi** (University of Georgia), **Mr. Rachid Bouabid** (Chemonics), **Mr. Mohamed Mounsif** (University of Georgia), and **Mr. Mohamed Mehdi** (University of Georgia) was fielded in June to help prepare and participate in a workshop on the replication of soil erosion control activities based on the experience of the Nakhla soil erosion control pilot project.
- **Mr. Brahim Souidi** (Chemonics) was fielded in June to complete the study on the reuse of treated water in Drarga.

- **Mr. Jalil El Fadli** (Chemonics) was fielded in June to assist in the development of a WRS brochure and to prepare press articles on WRS activities.
- **Mr. M'Hammed Tayaa** (Chemonics) was fielded in June to determine soil erosion rates in the Nakhla watershed.
- **Mr. Mohamed Sarehane** (Chemonics) was fielded in June to help implement the introduction of beehives in the Nakhla watershed.
- **Jean Tilly** (ECODIT) was fielded in August as interim Chief of Party. Mr. Tilly, who serves as WRS technical supervisor, ensured that project activities continued uninterrupted while the WRS Chief of Party and Technical Coordinator were on vacation.
- **Mr. Mohamed Mehdi** (University of Georgia) was fielded in October and November to conduct a study of the socio-economic impact of WRS soil erosion control activities in the Nakhla watershed.
- **Mr. Avijit Dasgupta** (Chemonics) and **Mr. Paul Larochelle** (Chemonics) were fielded in November to assist in the development of industrial norms and standards for tanneries.
- **Mr. Jean Tilly** (ECODIT) was fielded in November to work with the norms and standards team on preparing a background document for tanneries.
- **Mr. Joseph Karam** (ECODIT) was fielded in November to train project partners on using a cost recovery model for the Drarga wastewater treatment plant.
- **Mr. Driss Messaho** (ECODIT) was fielded in November to work with the tanners of Dokkarat in preparation for the start-up of the chromium recovery plant.
- **Mr. David Mulla** (Chemonics) was fielded in November and December to assess the progress of the soil erosion control activities in the Nakhla watershed.
- **Mr. Abdeljalil El Fadli** (Chemonics) was fielded in December to prepare press articles on WRS activities.
- **Mr. Jean Tilly** (ECODIT) was fielded in December to assist with the preparation of the WRS Year 2000 workplan.
- **Mr. Fouad Rachidi** (University of Georgia) was fielded in December to assist in the implementation of WRS soil erosion control activities in the Nakhla watershed.

#### 4. Meetings Attended

Table 1 below summarizes the key meetings and workshops organized or attended by WRS staff in 1999.

<b>Table 1</b>		
<b>Key Meeting Attended in 1999</b>		
<b>Meeting Description</b>	<b>Participants</b>	<b>Date</b>
Meeting with AID and Peace Corps	USAID, Peace Corps, WRS	January 12
Meeting of the Fes coordination committee	WRS, MOE, Wilaya of Fes, RADEEF	January 22
Meeting with the Agence du Nord on activities in Nakhla	Agence du Nord, WRS	January 29
USAID visit of Kim Finan to Agadir	USAID, WRS	January 31 and February 1
Opening of bids for Fes construction	WRS, MOE, Wilaya of Fes, RADEEF	February 10
Meeting with the Agence du Nord on indirect actions in Nakhla	Agence du Nord, MOE, WRS	February 11
Visit of the Nakhla watershed to monitor implementation	Agence du Nord, MOE, WRS, DPA of Tetouan	February 16
Meeting to monitor progress of the construction of the Dokkarat piping network	WRS, MOE, Wilaya of Fes, RADEEF, CID, GERAB	February 18
Meeting to monitor progress of the construction of the Drarga wastewater treatment plant	WRS, Commune of Drarga, Al Amal Association, Majestic	February 18
Work Plan review meeting	WRS, USAID	February 23
EHP debriefing	WRS, EHP, USAID	February 26
Meeting with Forward project	WRS, USAID, Forward project	March 2
Meeting to monitor progress of the construction of the Dokkarat piping network	WRS, MOE, Wilaya of Fes, RADEEF, CID, GERAB	March 5

<b>Table 1</b> <b>Key Meeting Attended in 1999</b>		
<b>Meeting Description</b>	<b>Participants</b>	<b>Date</b>
Enviromaroc forum in Casablanca	MOE, GTZ, WRS	March 8
Opening of Fes construction bids	WRS, MOE, Wilaya of Fes, RADEEF	March 9
USAID AA visit to the Drarga site	WRS, USAID	March 12
Meeting with the Wali of Fes	WRS, USAID, Wilaya of Fes	March 18
Meeting on the Nakhla contrat-programme	WRS, MOE, Agence du Nord, DPA	March 22
Meeting with MOE project cellules	WRS, MOE	April 7
USAID debriefing by Edward Rawson	WRS, USAID	April 23
Site visit to Fes	WRS, MOE, RADEEF, Wilaya, Contractors	April 29
Meeting with DPA on Contract-Program	WRS, DPA	May 4
Site visit to Agadir	WRS, USAID, Commune of Drarga, ERAC	May 6 - 7
Opening of bids for beehives and goat importation	WRS, Agence du Nord, Ministry of Agriculture	May 17
Norms and standards committee meeting	WRS, MOE, Travaux Publics, Ministry of Commerce & Industry	May 20
Meeting with RADEEF & Agence Française de Développement to discuss cooperation in Fes	WRS, RADEEF, AFD	May 28
Workshop on water issues in the Souss-Massa by the Association Tiwizi of Chtouka-Ait Baha	WRS, MOE, Wilaya of Agadir, IAV, Water User Associations	June 5
Site visit to Agadir	WRS, USAID, Commune of Drarga, Al Amal Association	June 9
Site visit to Fes	WRS, USAID, RADEEF, Wilaya of Fes	June 10

<b>Table 1</b> <b>Key Meeting Attended in 1999</b>		
<b>Meeting Description</b>	<b>Participants</b>	<b>Date</b>
Nakhla replication workshop	WRS, MOE, USAID, Ministry of Agriculture, Wilaya of Tetouan, Spanish Cooperation, UNDP, NGOs	June 14
Dave Swift debriefing	WRS, USAID	June 21
Distribution of beehives in the Nakhla watershed	WRS, USAID, Agence du Nord, UNDP, Wilaya of Tetouan, DPA	June 23
Meeting of the monitoring committee in Fes	Wilaya, RADEEF, MOE, WRS, Contractors	July 1
Meeting with the MOE working group on the Fes pilot project	MOE, WRS	July 6
Monitoring of project activities in Agadir	WRS, Commune of Drarga, Al Amal Association, Contractors	July 16
Meeting with project partners in Nakhla to prepare the Ambassador's visit	Wilaya, DPA of Tetouan, MOE, WRS	July 20
Meeting of the monitoring committee in Fes	Wilaya, RADEEF, MOE, WRS, Contractors	July 22
Monitoring of project activities in Agadir	WRS, Commune of Drarga, Al Amal Association, Contractors	July 23
Meeting of the monitoring committee in Fes	Wilaya, RADEEF, MOE, WRS, Contractors	August 19
Monitoring of project activities in Agadir	WRS, Commune of Drarga, Al Amal Association, Contractors	August 26 - 27
Meeting of the monitoring committee in Fes	Wilaya, RADEEF, MOE, WRS, Contractors	September 10
Monitoring of project activities in Agadir	WRS, Commune of Drarga, Al Amal Association, Contractors	September 13 - 14

<b>Table 1</b> <b>Key Meeting Attended in 1999</b>		
<b>Meeting Description</b>	<b>Participants</b>	<b>Date</b>
Meeting with MOE on norms and standards	MOE, WRS	September 20
Meeting with Peace Corps on Nakhla project	Peace Corps, WRS	September 28
U.S. Ambassador's visit to the Nakhla watershed	US. Ambassador, USAID, MOE, Wilaya of Tetouan, WRS	October 7
Meeting with WRS evaluation mission	WRS, Hagler-Bailly	October 13-14
Meetings in Agadir with WRS evaluation mission	USAID, WRS, Hagler-Bailly, ORMVASM	October 19
Meetings in Agadir with WRS evaluation mission	USAID, WRS, Hagler-Bailly, DRH	October 20
Meetings in Agadir with WRS evaluation mission	USAID, WRS, Hagler-Bailly, RAMSA, ONEP	October 21
Rountable meeting with key players in the water sector in Agadir	USAID, WRS, Hagler-Bailly, DRH, ONEP, RAMSA, Wilaya, ORMVASM, MPH, APEFEL	October 21
Visit of the WRS project in Fes with evaluation mission	WRS, Hagler-Bailly, RADEEF, Wilaya	October 26
Visit of WRS project in Nakhla with evaluation mission	WRS, Hagler-Bailly, DPA	October 27
Meeting with WRS evaluation team	WRS, Hagler-Bailly	October 29
USAID debriefing of evaluation mission	USAID, Hagler-Bailly, WRS	October 29
Kickoff meeting on norms and standards mission	WRS, MOE	November 1
Meeting with the DPA of Tetouan on Nakhla project	WRS, MOE, DPA	November 2
Meeting with MOE Minister Iraqui	MOE, USAID, WRS	November 8

<b>Table 1</b> <b>Key Meeting Attended in 1999</b>		
<b>Meeting Description</b>	<b>Participants</b>	<b>Date</b>
Technical training on Drarga plant - Agadir	WRS, MOE, Al Amal association,. Commune of Drarga, Wilaya, ONEP, DRH	November 8 - 11
Workshop on cost recovery for the Drarga project	WRS, MOE, USAID, Al Amal association,. Commune of Drarga, Wilaya, ONEP, DRH	November 12
Meeting with DGH on tannery norms and standards	WRS, DGH	November 16
Meeting of the MOE norms and standards committee	WRS, MOE	November 17
U.S Ambassador's visit to the Drarga wastewater treatment plant	U.S. Ambassador, USAID, Wilaya, Commune Agdal, WRS	November 19
Meeting with the DPA on the Nakhla project	WRS, DPA	December 1
Meeting with USAID	WRS, USAID	December 14

## 5. Deliverables

Table 2 summarizes the deliverables submitted in 1999.

<b>Table 2</b> <b>Deliverables Submitted in 1999</b>	
<b>Deliverable Title</b>	<b>Date</b>
Annual Work Plan 1999	January 1999
Options de valorisation des eaux usées épurées et des boues résiduaires en agriculture et en espaces verts - <b>Brahim Soudi</b>	January 1999
Annual Report January 1st - December 31, 1998	January 1999
Etude des possibilités de développement de l'apiculture dans le bassin versant de Oued Nakhla - <b>Mohamed Serehane</b>	March 1999
First Quarter Progress Report	May 5
Compte rendu de l'atelier sur la vulgarisation du projet pilote de contrôle de l'érosion des sols dans le bassin versant de Oued Nakhla <b>M'Hammed Tayaa, Fouad Rachid, Mohamed Mounsif &amp; Rachid Bouabid</b>	June 14
Potential for replication of the pilot project and development of a handbook of procedures - Oued Nakhla	June 21
Second Quarter 1999 Progress Report	July 23
Recouvrement des coûts du projet pilote de Drarga - Draft version <b>Joseph Karam</b>	July 18
Actions alternatives des sources d'énergie dans le bassin versant de Oued Nakhla <b>Fatima Zahid</b>	July 16
Third Quarter 1999 Progress Report	November 4
Recouvrement des coûts du projet pilote de Drarga - Final version <b>Joseph Karam</b>	December 16